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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,417	02/19/2002	Takuya Tanaka	TANAKA=111	9295

1444 7590 02/20/2004

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EXAMINER

JACKSON, MONIQUE R

ART UNIT	PAPER NUMBER
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1773

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/076,417

Applicant(s)

TANAKA ET AL.

e10

Examiner

Monique R Jackson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-12 and 14-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-12 and 14-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendment filed 11/25/03 has been entered. Claims 6 and 13 have been canceled. New claims 17-18 have been added. Claims 1-5, 7-12, and 14-18 are pending in the application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 1-5, 7-12, and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al (USPN 5,525,246) in view of Chen, Sr. et al (USPN 5,137,985.) Kamiya et al teaches a sliding bearing suitable for use in engines and a method of making the sliding bearing wherein a resin surface layer 5 is provided on a roughened surface of an aluminum bearing alloy layer 2 on a metal backing 1, and then heated or fired to harden the surface layer wherein an intermediate bonding layer may be first applied to the roughened surface, wherein the resin surface layer comprises a polyimide binder, such as an aromatic polyimide, polyetherimide, aromatic polyamide imide, or modified polyimides, in an amount of 10-45wt%; and a solid lubricant such as MoS₂, BN, WS₂, graphite or the like, in an amount of 55-90wt%, wherein the solid lubricants have the function of lowering and stabilizing the coefficient of friction, and may further include a friction adjusting agent that may replace 1-20% of the solid lubricant wherein the friction adjusting agent may be CrO₃, PbO, Al₂O₃, SiC or the like (*reads on hard particles comprising oxide and carbide and wherein the absence of "soft metal" from the layer or 0 vol% reads on "not more than 10% by volume"*) (Abstract; Col. 2, lines 1-58; Col. 2, line 65-Col 3, line 48.) Kamiya et al specifically teach examples that based on the density of the components of the resin surface layer, read upon the instantly claimed volume percents (Examples, Table I.)

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Kamiya et al teach utilizing polyimide resins in the surface layer due to their wear resistance and high temperature resistance as opposed to phenols (Col. 2, lines 22-35.) Kamiya et al further teach that the coating layer may be two or more layers wherein the Examiner takes the position that the invention taught by Kamiya et al comprising two layers reads on the limitation a bonding layer as claimed (Col. 2, lines 22-57), however it is further noted that the incorporation of an intermediate thermosetting adhesive layer to improve adhesion between the bearing alloy and the resin surface layer would have been obvious to one having ordinary skill in the art at the time of the invention. Though Kamiya et al teach that the resin may be a modified polyimide resin, Kamiya et al do not teach that the resin is polybenzimidazole as instantly claimed. However, polybenzimidazole is a known functional equivalent in the art to the polyimide resin taught by Kamiya et al, particularly for the surface layer of a bearing, and would have been obvious to one having ordinary skill in the art at the time of the invention. Specifically, Chen, Sr. et al teach a miscible blend of polybenzimidazoles and polyamideimides that provides improvements over the individual polymers wherein the blend may be compounded with graphite or molybdenum disulfide to produce self-lubricating wear surfaces for bearings and may also be suitable for high temperature applications, in engine components, as protective coatings over metal, or as wear coatings (Abstract; Col. 1-2; Col. 16, lines 23-69.) Hence one having ordinary skill in the art at the time of the invention would have been motivated to utilize polybenzimidazole in place of, or blended with, the polyimide resins in the invention taught by Kamiya et al given the teachings of Chen, Sr. et al, wherein one having ordinary skill in the art at the time of the invention would have been motivated to utilize routine experimentation to determine the optimum volume

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percentages of resin and solid lubricant to provide the desired lubricating properties for a particular end use.

4. Claims 1-5, 7-12, and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiya et al in view of Chen, Sr. et al and in further view of Andres et al or White (USPN 4,462,144) or Korshak et al. The teachings of Kamiya et al in view of Chen, Sr. et al are discussed above. With regards to the use of polybenzimidazole as a functional equivalent to polyimide and suitable in producing bearings or bearing surfaces, particularly in high temperature applications, it is further noted that White specifically suggests that polybenzimidazole is a suitable material comparable to polyimides and polyamide imides when the bearing is to be subjected to high temperatures (Col. 5, lines 28-35); Andres et al teach a self-lubricating composition comprising polybenzimidazole and internal lubricants such as graphite and boron nitride, useful for preparing bearings having excellent lubricating or low friction properties, wherein Andres teaches that the blend has excellent chemical resistance and high thermal properties as well excellent wear properties (Abstract; Col. 1-2); and Korshak et al teach that polybenzimidazole in conjunction with a filler such as MoS₂ provides excellent antifriction properties and overcomes disadvantages of cyclic polyimides in high temperature applications (Abstract; Col. 1.) Hence, one having ordinary skill in the art at the time of the invention would have been motivated to utilize polybenzimidazole in place of or in conjunction with the polyimide resin in the surface layer taught by Kamiya et al given the teachings of Chen, Sr. et al and in further view of Andres et al or White or Korshak et al.

Response to Arguments

5. Applicant's arguments filed 11/25/03 have been considered but are moot in view of the new ground(s) of rejection.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monique R Jackson whose telephone number is 571-272-1508. The examiner can normally be reached on Mondays-Thursdays, 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul J Thibodeau can be reached on 571-272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Monique R. Jackson
Primary Examiner
Technology Center 1700
February 12, 2004